

ANTENNAS AND PROPAGATION

Modeling, Simulation & Measurements

Edited by

MD. RAFIQUUL ISLAM B.Sc., M.Sc., Ph.D., MIEEE
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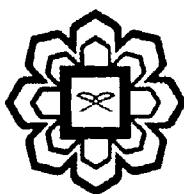
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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Chapter 8

Ultra Wideband Antenna with Band Notch Using Asymmetrical Feedline

AHM Zahirul Alam¹ and Md. Rafiqul Islam¹

8.1 Introduction

Antennas are the particularly challenging aspect of UWB technology. To satisfy such a requirement, various wideband antennas have been studied [1–7]. Among the many possible alternatives, planar monopole antennas are good candidates owing to their simple structures, low cost and ease of construction while featuring wide impedance bandwidth, pure vertical polarization and horizontal omnidirectional radiation pattern. However, the UWB communication systems use the 3.1–10.6 GHz frequency band, which includes the IEEE802.11a frequency band (5.15–5.825 GHz). Therefore, UWB communication systems may generate interference with IEEE802.11a. The UWB antenna must have the band-notched characteristic at 5.15–5.825 GHz in order to prevent the signal of the IEEE802.11a frequency band. Recently, various band-notched UWB antennas have been developed for UWB communications [8–10]. Such as the circular disc monopole antenna inserted by an arched slot [11], the square metal-plate monopole antenna with bevels embedded by an inverted U-shaped slot [12], and so on.

In this chapter, planner UWB antenna is design to operate within UWB. The UWB range is possible by using asymmetrical feedline and optimization of the partial ground.

8.2 Antenna Design

The structure of the antenna is shown in Figure 8.1. A rectangular monopole antenna of dimension 12.45 mm×16mm is placed on one side of an FR4 substrate of thickness 0.8mm and relative permittivity 4.4. The partial ground plane is located on the other side of the monopole. The dimension of the substrate is 32 mm×28.1mm. The antenna is fed by a microstrip of 50Ω feedline of width ‘W’ and placed ‘L’ distance from one edge of the substrate. The width of the partial ground is shown in Figure 8.1 as ‘G’. The parameters ‘W’, ‘L’ and ‘G’ are optimized to operate the antenna within UWB without the slot. The L-shaped slot is placed on the radiating patch with dimension ‘lw’ and ‘ll’ as shown in Figure 8.1 to obtained band notched characteristics . The width of the slot, ‘lw’ and ‘ll’ are varied to obtained desired band notched property.

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